$0.15\% \leq Si \leq 1.30\%$

$0.01\ \% \leq Al \leq 0.08\ \%$

$N \leq 0.015\ \%$ with $Ti \geq 3.5 \times \%\ N$;

- said long steel product being obtained from a semi-finished long product coming from continuous casting and hot-rolled in the austenitic range, then treated thermally to obtain a bainitic or essentially bainitic structure, and worked by a cold or hot plastic transformation into its final shape, exhibiting a tensile strength at break greater than 800 MPa.

2. Low-carbon steel mechanical component deformed by a cold process according to Claim 1, wherein the long steel product, from which it is derived by plastic transformation, is a rolled wire or rod treated thermally by cooling directly during its hot rolling at a cooling rate sufficient to provide it with a bainitic or essentially bainitic structure.

3. Low-carbon steel mechanical component forged according to Claim 1, wherein the long steel product, from which it is derived by a hot process plastic transformation, is a rolled rod or a wire, whose forged blank, which is extracted there from was treated thermally by quenching at a cooling rate sufficient to provide it with a bainitic or essentially bainitic structure through to the core, this from a quenching temperature of about 1200°C and more at which the blank was subjected to a plastic transformation by forging, bringing it to the final desired shape.

4. Low carbon steel mechanical component according to Claim 2, wherein the heat treatment used in its manufacture comprises a final slow cooling phase whose rate can be as low as 1°C/s at the core.

5. Low carbon steel mechanical component according to Claim 3, wherein the heat treatment used in its manufacture comprises a final slow cooling phase whose rate can be as low as 1°C/s at the core.

6. Low carbon steel mechanical component according to Claim 1, wherein the carbon content of the steel is comprised between 0.06 and 0.10%.

7. Low carbon steel mechanical component according to Claim 1, wherein the steel from which it is constituted has a molybdenum content not exceeding 0.30% and a manganese content of less than 1.80%.

8. A process for manufacturing a ready-for-use low-carbon steel mechanical component with elevated characteristics exhibiting a tensile strength at break of more than 800 MPa, said process comprising the following steps:

- starting from a long semi-finished product whose composition, apart from the iron and the unavoidable residual impurities that result from the steel process, at least complies with the following analysis, given in percentages by weight, based on the iron:

$C \leq 0.15\%$

$0.04\% \leq Nb \leq 0.10\%$

$0.001\% \leq B \leq 0.005\%$

$0.15\% \leq Mo \leq 0.35\%$

$1.3\% \leq Mn \leq 2.0\%$

$0.15\% \leq Si \leq 1.30\%$

$0.01\ \% \leq Al \leq 0.08\ \%$

$N \leq 0.015\ \%$ with $Ti \geq 3.5\ x\%\ N$;

- a long product (wire or rod) is rolled when hot, the removal temperature of the wire after rolling being below 1000°C;

- the resulting rolled long product is then subjected to a heat treatment, said treatment comprising a final slow cooling phase, whose rate can be as low as 1°C/s at the core to obtain a bainitic or essentially bainitic structure, said long product being subjected to plastic deformation to bring it to its desired final shape, the plastic deformation process being able to be carried out after or during said heat treatment.

9. Long low-carbon steel product intended for transformation into a ready-for-use mechanical component of elevated characteristics according to Claim 1, wherein said product has the shape of a hot-rolled wire or rod and that the steel, which forms it, at least complies with the following analysis, given in percentages by weight, based on the iron:

$C \leq 0.15\%$

$1.3\% \leq Mn \leq 2.0\%$

$0.04\% \leq Nb \leq 0.10\%$

$0.15\% \leq Mo \leq 0.35\%$

$0.001\% \leq B \leq 0.005\%$

$0.15\% \leq Si \leq 1.30\%$

$0.01\ \% \leq Al \leq 0.08\ \%$

$N \leq 0.015\ \%$ with $Ti \geq 3.5\ x\ \%\ N$.